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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/705,274	11/03/2000	Misbahul Azam	ONS00114	4443

7590 06/06/2003
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EXAMINER

NGUYEN, KHIEM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/705,274

Applicant(s)

AZAM ET AL.

Examiner

Khiem D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

In view of the arguments presented in the Appeal Brief filed Dec. 19, 2002, paper No. 11, prosecution on the merits is reopened to address the issues raised in the Brief. The grounds of rejections in the prior Office actions are withdrawn, and new grounds of rejection are presented here. 37 CFR 1.193 (b)(2) applies:

(2) Where prosecution is reopened by the primary examiner after an appeal or reply brief has been filed, appellant must exercise one of the following two options to avoid abandonment of the application:

- (i) File a reply under § 1.111, if the Office action is not final, or a reply under § 1.113, if the Office action is final; or
- (ii) Request reinstatement of the appeal. If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (§ § 1.130, 1.131 or 1.132) or other evidence are permitted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madson

(U.S. Pub. 2001/0049167) in view of Lowrey et al. (U.S. Patent 5,013,680).

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Madson discloses in figures 1-12 and related text a method of forming a trench in a semiconductor device, comprising:

providing a substrate (figure 8A, 800) for the semiconductor device;

forming a first epitaxial layer (figure 8A, 802) on the substrate;

disposing a masking material (figure 8A, 804) on the substrate and first epitaxial layer, wherein the masking layer is from a group consisting of silicon dioxide and silicon nitride (paragraph [0055]);

forming a mask (paragraph [0056]) at the location of the trench after disposing the masking material;

forming a protruding portion (figure 8B, 806) at a location of the trench by forming an opening in the masking material adjacent to the location of the trench, wherein forming the protruding portion further includes performing an etch step to remove the masking material where the mask is absent to form the opening (paragraph [0056]);

depositing an epitaxial material comprising silicon to fill in the openings (figure 8C, 808), wherein depositing the epitaxial material includes using a selective epitaxial growth process to fill the openings (paragraph [0057]);

removing the protruding portion to form the trench (figure 8D, 810) within the second epitaxial layer aligned with the major surface of the first epitaxial layer of the semiconductor device (paragraph [0058]);

depositing a gate structure (figure 10H, 28) within the trench to form the semiconductor device.

Madson discloses removing the protruding portion to form the trench but fails to completely remove the protruding portion and etching the semiconductor material to round off corners of the trench.

Lowrey discloses forming a protruding portion 31 at a location of the trench by forming an opening in the masking material adjacent to the location of the trench; depositing a semiconductor material 41 to fill in the opening; removing the protruding portion to form the trench 71 and etching the semiconductor material to round off corners of the trench (col. 9, line 61 to col. 10, line 38 and FIGS. 4-7B). It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Madson and Lowrey to enable the trench having round off corners of Madson to augment uniform deposition of subsequent filling materials.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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K.N.

June 2, 2003



Oluk Chaudhuri
Supervisory Patent Examiner
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